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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/846,138	04/30/2001	Howard E. Hilton	10992825-1	7892

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EXAMINER	
PERILLA, JASON M	

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 09/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/846,138	HILTON ET AL.	
	Examiner	Art Unit	
	Jason M Perilla	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☒ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 April 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/30/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-12 are pending in the instant application.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on April 30, 2001 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

3. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 1-5 and 12 are objected to because of the following informalities:

Regarding claim 1, the claim is objected to because the generation of a finite impulse response in line 9 is unclear. One skilled in the art is unable to formulate a finite impulse response *as an entity* according to specification. However, the generation of a finite impulse response filter is understood by one being skilled in the art.

Regarding claim 12, in step c), "the first half" and "the second half" are lacking antecedent basis. In step d), "performing a N-point FFT" should be replaced by –performing an N-point FFT--. In step e), the vectors y_n and X_{N-k} are lacking antecedent basis in the claim. In step f), "the second half" is lacking antecedent basis. In step g), "for the next N/2 data values" should be replaced by –for the next block of N/2 data values—for clarity of the claim language.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, in the method of the claim, steps c), d), and e), taken together, are unclear and indefinite because one skilled in the art is unable to determine a clear and definite limitation provided by each step in view of the remaining steps. In step c) the formulation of a composite finite impulse response is indefinite in view of steps d) and e) because steps d) and e) may be interpreted to be too nearly equivalent to step c) to make a definite interpretation for step c). For instance, the steps are so closely analogous that they, taken together, render any step (x) individually to be indefinite because in view of any other step (y), the meaning of step (x) thereby becomes confused due to the apparent overlap of steps (x) and (y) which would not be a definite interpretation.

Claim Rejections - 35 USC § 102

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 6-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Iwamatsu (US 6175591).

Regarding claim 6, Iwamatsu discloses by figure 4 a generalized digital filter for filtering two-component signal information (Ich and Qch), comprising: a) a dual input port ("Ich INPUT" and "Qch INPUT"), having an I input for a signal x_I and a Q input for a signal x_Q, wherein x_I and x_Q are components of a two-component input signal x (figure 2, "IF-IN") ; b) a dual output port, having an I output for a signal y_I (fig. 4, "Ich OUTPUT) and a Q output for a signal y_Q (fig. 4, "Qch OUTPUT"), wherein y_I and y_Q are components of a two-component output signal y; c) a first signal path (25a-1), characterized by a first impulse response (FIR filter 25a-1), having an input coupled to the I input port and a first output; d) a second signal path (25b-1), characterized by a second impulse response (FIR filter 25b-1), having an input coupled to the Q input port and a second output; e) a third signal path (25a-2), characterized by a third impulse response (FIR filter 25a-2), having an input coupled to the I input port and a third output; f) a fourth signal path (25b-2), characterized by a fourth impulse response (FIR filter 25b-2), having an input coupled to the Q input port and a fourth output; g) summing means (not labeled) for adding said first and second outputs and for coupling the

sum thereof to said I output; h) summing means (not labeled) for adding said third and fourth outputs and for coupling the sum thereof to said Q output.

Regarding claim 7, Iwamatsu discloses the limitations of claim 6 as applied above. Further, according to figure 4 of Iwamatsu, the four impulse responses are independent of one another because they are embodied as four separate FIR filters.

Regarding claim 8, Iwamatsu discloses the limitations of claim 6 as applied above. Further, Iwamatsu discloses that all four impulse responses are characterized to have finite lengths because they are each embodied as a (FIR) finite impulse response filter (col. 2, lines 14-16).

Regarding claim 9, Iwamatsu discloses the limitations of claim 8 as applied above. Further, Iwamatsu discloses that all four impulse responses are each constrained to have equal lengths of N taps (col. 2, lines 14-16).

Regarding claim 10, Iwamatsu discloses the limitations of claim 6 as applied above. Further, Iwamatsu discloses that the four paths are realized by finite impulse response filters as applied to claim 8 above.

Regarding claim 11, Iwamatsu discloses the limitations of claim 10 as applied above. Further, Iwamatsu discloses that each of the finite impulse response filters are independently characterized because each of the filters is independent according to figure 4.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu.

Regarding claim 1, Iwamatsu discloses in an information transmission system comprising a plurality of elements for generating, transporting, and receiving information (a common transmission/reception system; abstract), wherein some elements are defective and impose impairments on the information passing therethrough (inherent), a method for correcting said impairments, comprising all steps a)-g) in the claim. Regarding step a), Iwamatsu discloses by figure 4 a filter (traversal equalizer; col. 2, lines 5-6) used to eliminate transmission path distortion. In the design of the filter it is inherent or at least obvious to one skilled in the art that the identification of the defective elements or those that cause the path distortion and the subsequent characterization of each would be performed for the generation of the filter. In other words, to design the filter, it would be inherent that for the utility of the filter, the identification and characterization of the defects to overcome by the filter would be investigated. Regarding step b), the determination of a correction characteristic corresponding to each defective element which, when applied to information passing through said element, corrects the impairment imposed by said element defines the determination of the filter or the design of the filter. Hence, the design of the filter itself, which is done according to figure 4, is

inherently or at least obviously a determination of the correction characteristics. Regarding step c), Iwamatsu discloses by figure 4 formulating each correction characteristic as a composite, two channel I and Q finite impulse response, having I-I (filter 25a-1) and Q-Q (filter 25b-1) direct components and I-Q (filter 25a-2) and Q-I (filter 25b-2) cross components. Regarding step d), Iwamatsu discloses combining said correction characteristics of said defective elements into a single correction characteristic comprising two direct and two cross components. The filter of figure 4, taken as a whole, represents the combination of a single correction characteristic of all the elements (as embodied by an FIR filter) which comprises two direct and two cross components as applied to step c) above. Regarding step e), Iwamatsu discloses identifying each of the four components of the combined correction characteristics with corresponding direct and cross impulse responses of a generalized two-channel filter as applied in step d) above. In the process of generating the filter, the identification of the four components (each of the four FIR filters) is performed. Regarding steps f) and g), Iwamatsu discloses by figure 4 the creation of the filter in accordance with the components of step (e) and the positioning the filter in the information transmission system for correcting the impairments imposed on the information by the defective elements (abstract).

Regarding claim 5, Iwamatsu discloses the limitations of claim 1 as applied above. Further, Iwamatsu discloses by figure 4 that step (c) further includes arranging said direct and said cross components as terms of a set of 2x2 matrices; and step (d) further includes arranging said single correction

characteristic as terms of a set of 2x2 matrices. The limitations of claim 5 are disclosed by figure 4 because of application of filters 25a-1, 25a-2, 25b-1, and 25-b2 to the Ich and Qch channels by the cross product and addition of the circuit design.

10. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu in view of Abe (US 5857004).

Regarding claim 2, Iwamatsu discloses the limitations of claim 1 as applied above. Iwamatsu discloses a method in an information transmission system (fig. 2) wherein the system includes a two-channel down converter (fig. 2, refs. 22e and 22f; col. 1, lines 55-67), and I and Q data processing channels (fig. 2, "Ich" and "Qch"). Iwamatsu discloses that the systems takes an intermediate frequency (IF) signal as input (col. 1, lines 37-40) but does not expressly disclose the system including the elements of an IF filter. However, Abe teaches by figure 1 an analogous receiver which creates an IF signal for processing by I and Q data processing channels. The system utilizes an IF band pass filter (BPF; fig. 1, ref. 23; col. 1, lines 48-50) for filtering out of band frequencies which are unwanted by the system. Therefore, it would have been obvious to one having ordinary skill in the art at the time which the invention was made to utilize an IF BPF as taught by Abe with the IF information transmission system of Iwamatsu because it could be advantageously used to filter unwanted out of band frequency noise from the signal being received.

Regarding claim 3, Iwamatsu discloses the limitations of claim 1 as applied above. Further, Iwamatsu in view of Abe disclose the further limitations

of claim 3 including I and Q data channels (Abe; fig. 2, "Ich" and "Qch"), a two channel up-converting modulator (fig. 2, refs. 22e and 22f; col. 1, lines 55-67), and an IF filter (Abe; fig. 1, ref. 23; col. 1, lines 48-50) as applied to claim 2 above.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu in view of Yom (US 5781589).

Regarding claim 4, Iwamatsu discloses the limitations of claim 1 as applied above. Iwamatsu does not explicitly disclose the further limitations of claim 4. However, to one having ordinary skill in the art, the further limitations of claim 4 are obvious in view of Yom. Yom teaches by figure 2 a method for correcting impairments in a transmission system which is analogous to that of Iwamatsu. Yom teaches the benefits of the frequency domain equalizer or filter of figure 2 as being magnitude slope correction (col. 1, lines 7-20). Yom teaches that the equalizer for correcting impairments of the system detects and corrects the received signal magnitudes with respect to the frequency band of the received signals by a slope equalizer or filter. Therefore, it would have been obvious to perform the method of generating a filter of Iwamatsu in view of the magnitude slope vs. frequency correction as taught by Yom because the magnitude of the received signal could be compensated to overcome the defects which are induced by the transmission system. One skilled in the art identifies that the method taught by Yom is applicable for the correction of the defective elements of the transmission system in the filter of Iwamatsu. To build the correction filter of Iwamatsu in view of Yom for magnitude vs. frequency slope

correction, one would be required to perform a frequency analysis of the system, and hence a frequency analysis of each defective element as claimed in claim 4 (i). Therefore, one skilled in the art would find the step of claim 4 (i) to be an obvious step. The further limitation to claim 1 (b) provided by claim 4 (ii) is obvious because to overcome the defect in the frequency characteristic which is derived by the frequency analysis, a filter having a complementary frequency characteristic would be created to remove the defect or impairment. One skilled in the art identifies that the purpose of a filter is to complement a corresponding defect in the filtered signal. Yom teaches the use of Fourier transforms (col. 2, lines 30-31) and frequency domain analysis which are well known in the art for converting signals between the time and frequency domains. Yom teaches that the in phase filter (UI(ω)) and the quadrature phase filter (UQ(ω)) are realized in the frequency domain because they are represented by capital letter notation in equations 5 and 6 (col. 2). One skilled in the art would find it obvious to create a frequency characteristic complementary filter as is claimed in claim 4 (ii) in the frequency domain using Fourier transforms because the calculations required to generate the filter are easier to perform in the frequency domain. Regarding the limitation of claim 4 (iii), to realize such a complementary characteristic filter in the time domain, it would be obvious that conversion to the time domain by an inverse Fourier transform would be required to implement it. Further, a discrete Fourier transform as claimed in claim 4 (iii) would be performed in the case that the filter is implemented digitally as is the filter of Iwamatsu.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following prior art of record not relied upon above is cited to further show the state of the art with respect to transversal filters and equalizers.

U.S. Pat. No. 6148048 to Kerth et al.

U.S. Pat. No. 4308618 to Levy et al.

U.S. Pat. No. 5835731 to Werner et al.

U.S. Pat. No. 5677932 to Comte et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (571) 272-3056. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
September 10, 2004

jmp

CHIEH M. FAN
PRIMARY EXAMINER